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NOTICE OF PROPOSED RULE MAKING, FCC 02-136, Part II. 135.7-137.8 kHz and 160-190 kHz bands (RM-9404), Comments

Introduction

I am a German amateur radio operator (callsign DK8KW), also holding a US Extra Class license (callsign W1KW) since 1990. I would like to comment on your Notice of Proposed Rulemaking of May 2, 2002 as an interested party in two respects:

a) as a holder of a US license and

b) as a potential communication partner to U.S. amateur radio stations in transcontinental amateur radio operations on the 135.7 to 137.8 kHz amateur radio band.

EIRP/ERP

The CEPT/ERC Recommendation 62-01 E (Mainz 1997) recommends that the band 135.7-137.8 kHz may be used with a maximum ERP of 1 Watt on a secondary basis by the Amateur Service in CEPT countries.

Measurements from central Germany (Hannover) made during the past 4 years show that almost none of the European stations exceeds this 1 W ERP limit (despite some stations with special temporary permits, see attachment 1). The majority of the successful transatlantic transmissions on LF were made with an ERP very close to the 1 Watt limit. During the transatlantic transmissions it was revealed that every single dB was important for the success and many European amateurs have fine-tuned their antennas to achieve a few dB increase in radiated power. The same is true considering the very noisy conditions amateurs usually face when operating on LF.

ERP and EIRP differ in magnitude by 2.15 dB. The ARRL proposal of 2 Watt EIRP is approximately equivalent to the 1 Watt ERP limit recommended in Europe. Therefore I suggest to either allow 2 Watt EIRP or 1 Watt ERP instead of 1 Watt EIRP.

PEP

The experience over the past 5 years in Europe show that it is very difficult to build an LF antenna that has more than - 30 dB efficiency. Even amateur radio antenna structures that are considered large on other bands (e.g. that have a height of 30 m [90 ft]) are very small compared to the wavelength of 2200 m. The radiation resistance of a short vertical monopole antenna with a capacitive top-load and a height of 30 m (90 ft) is approximately 0.3 Ohm. According to the European experience, the typical resistance of all losses comprising of the ground loss and the environmental losses caused by trees, leaves, etc., is between 40 and well over 100 Ohm. With 100 Watt PEP, a ground/environmental loss resistance of 40 Ohm results in an antenna current of 1.6 Amperes. Using the radiation resistance of the 30 m high monopole this results in an ERP of 0.7 Watt.

Considering much smaller antenna structures in the range of 20 m (60 feet) height (radiation resistance 0,13 Ohm) and a ground/environmental loss resistance of 80 Ohm (which is more typical) this results in an ERP of only 160 mW (some excellent information on antennas and radiation on LF has been collected by ON7YD and can be found at http://www.qsl.net/on7yd/136ant.htm.)

Many European authorities allow the 1 Watt ERP without limiting the PEP (Germany: generally 20 Watt PEP are allowed, however the Germany license authority RegTP issues special licenses for 1 Watt ERP without any PEP limit).

Therefore the ARRL proposal of 400 Watt PEP seems to be appropriate instead of limiting the PEP to 100 Watt.

Possible Interference with Identification Tag Devices

My personal experience with the identification tag devices is an electronically controlled cat flap that is installed just beside the LF amateur radio station. This cat-flap (manufacturer Staywell/U.K.) operates in a way that the cat has an identification tag fixed to it's collar and the flap is operated by identifying the code on the tag by transmitting a low-power LF signal. This system is *not influenced* by the operation of my 350 Watt PEP LF station of the 135.7 – 137.8 kHz signal (ERP approximately 350 mW).

Bandwidth

In Germany the maximum allowed bandwidth on the 135.7 – 137.8 kHz band is 800 Hz. With this limitation in mind, Markus Vester, DF6NM and I have developed a way to transmit voice. The speed of the voice is reduced and so the bandwidth is reduced as well. On the receiving side the speed of the slow-voice signal is increased again and the normal speed content of the transmission is re-gained. Additionally I have experimented with various other types of transmissions such as radio teletype (RTTY), PSK31, HELL, etc. Many of those modes can not be used with a bandwidth of only 100 Hz.

Therefore a bandwidth limitation of at least 400 Hz seems to be more appropriate.

LF Amateur Operator Density

Taking into account the average expected LF amateur radio density in the U.S., many of the possible interference cases become very unlikely.

There are no off-the-shelve amateur radio transmitters that can be bought, additionally the special antennas needed and the limited operating possibilities on LF reduce the total number of amateur radio operators that plan to be active on LF.

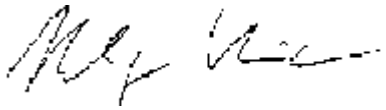
In Germany for example there are 80.000 licensed amateur radio operators. Since the LF band between 135.7 to 137.8 kHz became available in 1999, the total number of active amateurs operating on LF has always been in the range of only 40.

This means that only every 2000th amateur radio operator is active on LF.

Further Information

Further information on LF amateur radio operation in general and on antenna efficiency measurements can be obtained from my homepage http://www.qru.de.

Best regards, vy 73



(Holger ‚Geri' Kinzel, DK8KW, W1KW)

Appendix: Field Strength Measurement of European Amateur Radio Stations, 1998 to 2002